Amendments to the Specification:

Please replace the following paragraph beginning on page 4, lines10-23 and ending on page 5, lines 1-8 with the following amended paragraph:

To accomplish the above object and other objects, ~~the present invention includes in an optical network system wherein a signal to be transmitted is converted to an optical signal of a prescribed wavelength and transmitted over an optical transmission path by a transmit-end wavelength converter, and the optical signal from the optical transmission path is received and wavelength-converted in a receive-end wavelength converter, for regenerating the signal to be transmitted, the transmit-end wavelength converter which further comprises a circuit for generating a test signal for testing optical transmission quality as a digital signal when a light path (an optical transmission path) is formed between a transmit end and a receive end; a circuit for selectively inserting the test signal in the light path; and the receive-end wavelength converter comprises a selective extractor for selectively extracting the test signal from a receive signal; and a test comparison circuit for testing the selectively extracted test signal as a digital signal for testing optical transmission quality. The main function of the test comparison circuit is to perform bit error count/bit error rate calculation as well as other quality assessments.~~

~~The present invention achieves transparent communication by transmitting the client's digital optical signal directly; i.e., without modifying digital data signal parameters such as data transmission rate, transmission format, or protocol. The client's optical signal is processed by the transponder to change only its light wavelength as is done in wavelength-division multiplex. Also provided in the transponder is a simple test function unit whereby transmission quality at the transparent communication level is easily detected. Thus a high-quality transparent optical transmission system is realized by changing optical paths, etc., based on the detected transmission quality.~~ according to the first aspect of the current invention, an optical network system with quality control function in the optical network system wherein a signal to be transmitted is converted to an optical signal of a prescribed wavelength and transmitted over an optical transmission

path by a transmit-end wavelength converter, and the optical signal from the optical transmission path is received and wavelength-converted by a receive-end wavelength converter, for regenerating the signal to be transmitted, the optical network system including, the transmit-end wavelength converter for a transmit end with a first transponder further including, an optical signal input unit for inputting an optical signal to be transmitted, a test signal generator circuit ultimately connected to the optical signal input unit for generating a test signal for testing optical transmission quality, the test signal generator circuit further including, a clock generator for generating a clock signal indicative of a bit rate to be added to the test signal, an 'all 1s and all 0s' generator circuit for generating 'all 1s and all 0s' signals, and a scrambler circuit connected to the 'all 1s and all 0s' generator circuit for scrambling the 'all 1s and all 0s' signals to generate a scrambled test signal, an insertion circuit connected to the optical signal input unit and the test signal generator circuit for outputting an output signal by selectively inserting the test signal from the test signal generator circuit into the transmission path formed between the transmit end and a receive end, and a converter connected to the insertion circuit for converting the output signal of the insertion circuit to a predetermined optical wavelength, and the receive-end wavelength converter at the receive end with a second transponder further including, an extraction circuit for selectively extracting the test signal in the optical signal from the transmission path, a test comparison circuit connected to the extraction circuit for determining the optical transmission quality based on the test signal extracted by the extraction circuit, the test comparison circuit further including, a clock extraction circuit for extracting the clock signal from the test signal that is received at the receive end in order to synchronize with the bit rate of the selected test signal, a descrambler circuit connected to the clock extraction circuit for using the clock component for descrambling the scrambled test signal to generate descrambled signals, a selector circuit connected to the descrambler unit for selecting one of the descrambled signals from the descrambler circuit; and a comparison test circuit connected to the selector circuit for performing a test signal comparison and a bit error count/computation of the selected descrambled signal.

According to the second aspect of the current invention, an optical transponder in connection with a client line and an optical transmission line, including a first optical to electronic (O/E) converter for converting an optical signal from the client line to an electronic signal, a signal testing unit connected to the first O/E converter for selectively adding a scrambled test signal to the electronic signal so as to generate a test-signal-contained electronic signal, the signal testing unit further including, a clock generator for generating a clock signal indicative of a bit rate of a scrambled test signal to be added to the electronic signal, an 'all 1s and all 0s' generator circuit for generating 'all 1s and all 0s' signals, and a scrambler circuit connected to the 'all 1s and all 0s' generator circuit for scrambling the 'all 1s and all 0s' signals to generate the scrambled test signal, a first electronic to optical (E/0) converter connected to the signal testing unit for converting the test-signal-contained electronic signal to generate a test-signal-contained optical signal to be transmitted in the optical transmission line, a second optical to electronic (O/E) converter connected to the signal testing unit for converting a received test-signal-contained optical signal from the optical transmission line to a second test-signal-contained electronic signal, wherein the signal testing unit determines the quality of transmission in the optical transmission line based upon the second test-signal-contained electronic signal, the signal testing unit further including, a clock extraction circuit for extracting the clock signal from the second test-signal-contained electronic signal in order to synchronize with the bit rate of the electronic test signal, a descrambler circuit connected to the clock extraction circuit for using a clock signal component for descrambling a scrambled test signal component of the second test-signal contained electronic signal to generate descrambled signals, a selector circuit connected to the descrambler unit for selecting one of the descrambled signals from the descrambler circuit, a comparison test circuit connected to the selector circuit for performing a test signal comparison and a bit error count/computation of the selected descrambled signal, and a second electronic to optical (E/0) converter connected to the signal testing unit for converting the second test-signal-contained electronic signal to generate a received optical signal for the client line.

According to the third aspect of the current invention, an optical signal network in connection with client lines and an optical network transmission line, a plurality of nodes each connected to a corresponding one of the client lines and the optical network transmission line, the client lines each having an optical signal at a predetermined optical wavelength, the optical network transmission line having an optical signal including multiplexed wavelengths, each of the nodes including, an optical wavelength separator connected to the optical network transmission line for separating a desired wavelength from the optical signal including multiplexed wavelengths, an optical wavelength combiner connected to the client lines and the optical network transmission line for creating the optical signal including multiplexed wavelengths, and a transponder connected to the optical wavelength separator and the optical wavelength combiner for converting an optical signal at a first wavelength to a second wavelength, the transponder further including a set of optical-to-electronic converters, electronic-to-optical converters and a transmission quality testing unit connected between an optical-to-electronic converter and an electronic-to-optical converter for testing a transmission quality of the optical network transmission line, the transmission quality testing unit further including, a test signal generator circuit for generating a test signal for testing optical network transmission line quality, the test signal generator circuit further including, a clock generator connected to the test signal generator circuit for generating a clock signal indicative of a bit rate of the test signal from the test signal generator circuit, an 'all 1s and all 0s' generator circuit for generating 'all 1s and 0s' signals, a scrambler circuit connected to the 'all 1s and all 0s'generator circuit for scrambling the 'all 1s and all 0s' signals to generate a scrambled test signal, a test comparison circuit for determining the optical network transmission line quality based on a test signal received from other nodes, the test comparison circuit further including, a clock extraction circuit for extracting a clock signal from a separated wavelength signal in order to determine the bit rate of the separated test signal, a descrambler circuit connected to the clock extraction circuit for using the clock signal for descrambling a received scrambled test signal to generate descrambled signals, a selector circuit connected to the descrambler

unit for selecting one of the descrambled signals from the descrambler circuit, and a comparison test circuit connected to the selector circuit for performing a test signal comparison and a bit error count/computation of a selected descrambled signal.

According to the fourth aspect of the current invention, method of testing transmission quality in an optical network having optical transmission lines and client lines connected to the optical transmission lines, including, converting an optical signal at a first wavelength from one of the client lines to an electrical signal in a transponder, generating a test signal for testing optical transmission line quality, specifying a bit rate of the test signal by adding a clock signal to a test signal, adding the electrical signal and the test signal in the transponder to create a sum signal, scrambling the sum signal to generate a scrambled test signal, converting the scrambled test signal to an optical signal at a second wavelength in the transponder to be transmitted in the optical transmission lines, converting an optical signal at the second wavelength from the optical transmission lines to a second electrical signal in the transponder, extracting a clock signal from the second electrical signal, descrambling the second electrical signal based upon the extracted clock signal to generate descrambled signals, selecting one of the descrambled signals, performing a test signal comparison and a bit error count/computation with the selected descrambled signal, synchronizing the bit rate of the test signal with the clock signal, determining transmission quality based upon the test signal comparison in the transponder, and converting the second electrical signal to an optical signal at the first wavelength in the transponder to be outputted to the one of the client lines.